



# *X-Plain™*

## *How to Prevent Back Pain*

### **Reference Summary**

Back pain is one of the most common medical problems in the U.S. It affects most people at least once in their lifetime. If not taken seriously, back pain can last for a long period of time, and can become disabling.

This reference summary will help you understand the anatomy of the back, the most common causes of back pain, and measures you can take to prevent back pain.

#### **Anatomy**

The back has two main parts: the spine and the back muscles. The back muscles are attached to the spine. The spine consists of bones called vertebrae.

The vertebrae are joined together by the facet joints. Softer disks separate the vertebrae. They allow the spine to bend and flex. They also act as cushions in between the vertebrae and absorb shock and vibration produced by walking and running.

Nerves connecting the brain to the body make up the spinal cord. The vertebrae protect the spinal cord. Nerves branch off from the spinal cord to various

organs and muscles including those in the arms and legs.

The nerves carry instructions from the brain to the muscles, organs, and limbs. They also carry sensations such as pain from different parts of the body to the brain.

The spine is joined to the pelvis, or hip, by the sacroiliac joints. Unlike most joints, the sacroiliac joints are fixed and do not move.

#### **Causes Of Back Pain**

The most common cause of back pain is muscle spasm. An awkward movement of the back can lead to a severe muscle spasm. The muscle spasm causes the back to “lock” and can cause severe pain.

A muscle spasm can occur after a simple sneeze or cough. It can also occur after an awkward bending or twisting motion. A movement as simple as bending to tie a shoe or twisting the back to turn and face in a different direction can cause such a spasm.

Muscle spasms can also occur when a heavy object is lifted incorrectly. Muscle spasms

tend to get better over time. Severe cases of muscle spasm can be treated with physical therapy and medication.

Long lasting back pain can occur after accidents that have resulted in injury to the disks, the facet joints, or sacroiliac joints of the back.

#### **Disks And Their Problems**

The disks in the back act as cushions between vertebrae. A disk contains a central area called the “nucleus pulposus,” which means soft center.

The nucleus pulposus is surrounded by a tougher part of the disk called the “annulus fibrosis.” The annulus fibrosis holds the vertebrae together and prevents the content of the nucleus pulposus from pushing outward.

Disks are usually moist, like a sponge with water in it. As a person gets older, or after a disk gets injured, it starts losing water and becomes stiffer. The disk becomes less useful in cushioning the back. This is known as disk degeneration.

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As disk degeneration worsens, bone from the vertebrae above and below the disk starts growing around it. The new bone growth is known as a “spur.”

If spurs get large enough, they may start putting pressure on the nerves in the spinal canal, causing pain, numbness, and weakness down the legs.

The facet joints are also very important in keeping the spine in alignment and allowing the spine to move in different directions. Each vertebra has 4 facet joints, 2 holding the vertebra to the above vertebra, and the other 2 holding the vertebra to the lower vertebra.

At each of these locations, there are 2 facets, a right and left. The facet of the above vertebra and the facet of the lower vertebra form a facet joint. The facets are lined up by tissue called the synovium, in which a lubricating material is secreted.

The synovium and the lubricating material allow the facets in the joint to slide on each other without bone rubbing on bone. As arthritis or degeneration sets in the spine, this synovium starts wearing off resulting in back pain and the inability of the facet joints to function properly.

As the disks and the facets weaken, vertebrae may start to slowly slide on each other

causing narrowing of the spinal canal. The slippage of the vertebrae is known as “spondylolisthesis.” The narrowing of the spinal canal is known as “spinal stenosis.”

These various changes in the spine are collectively known as “spinal degeneration” or “spinal spondylosis.” Spinal degeneration can occur rapidly in persons with arthritic problems: these include osteoarthritis and rheumatoid arthritis.

Spinal degeneration can cause severe back pain, leg pain, numbness, and weakness as more pressure is applied on the nerves in the spinal canal.

### **Other Disk Problems**

Over time, because of injury or degeneration, disks start to bulge and change shape. If the annulus fibrosis tears, this is known as an annular tear. When the inside of the disk, or nucleus pulposus, starts exiting out of the tear, this is known as “disk herniation” or “disk extrusion.”

Sometimes the disk herniation detaches itself from the main part of the disk, this is then known as a “free fragment.”

Free fragments remain very close to the disk from which they herniated.

When the disk bulge, or the disk herniation, pushes on a nerve in the back, it can lead to severe

leg pain, numbness, and weakness. This is known as “sciatica.”

### **Back Pain - Sacroiliac Joints**

The sacroiliac joints join the tailbone to the pelvis, or hipbone. We have two such joints, a right and a left sacroiliac joint, or SI joint.

These joints are not mobile like other joints in the body such as the knee or elbow. If these joints get injured or start degenerating, they can become very painful causing severe low back pain at either side of the upper buttocks. Sometimes this kind of pain can be felt down the legs.

### **Preventing Back Pain**

The best way to prevent back and leg pain is to regularly exercise the back. Back strengthening and stretching exercises are recommended at least 2 or 3 times a week.

The following are some examples of back exercises:

- **Partial sit-up**

With bent knee, slowly raise your head and shoulders off the floor, and hold for 3 minutes.

- **Knee-to-Chest Raise**

Lie down. Slowly pull knees to chest, relaxing your neck and back, hold for 10 seconds. Repeat 10 times.

- **Press-up**

Lie down with hands near shoulders and pelvis on floor. Press up painlessly, hold for 10 seconds, and repeat 10 times.

back and adopting good body techniques.

These exercises strengthen the back muscles, which allow them to withstand the rigors of everyday activities. If you have had previous back pain or medical problems, make sure to check with your doctor before starting these exercises.

### **Good Back Techniques**

Another way of preventing back and leg pain is by using good back techniques at home and at work

Adopt a straight posture, sitting or standing. You should try not to bend the back. Bend instead at the knees or at the hips. This is true while lifting objects, tying shoes, putting socks or pants on, etc.

### **Summary**

Back pain is the most common medical problem in the U.S. It is mostly caused by muscle spasms and degeneration of the disks in the spine. If not taken seriously, back pain can become very disabling.

Back pain will affect most people at one time in their lives. Action can be taken to prevent back pain or postpone the degeneration of the spine and disks. Preventive measures include strengthening of the

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